REMARKS

Filed concurrently herewith is a Request for One-Month Extension of Time which extends the shortened statutory period for response to July 6, 2006. Accordingly, Applicants respectfully submit that this response is being timely filed.

The Official Action dated March 6, 2006 has been received and its contents carefully noted. In view thereof, claims 1, 5, 11 and 14 have been amended in order to better define that which Applicants regard as the invention. As previously, claims 1, 2, 4, 5, and 7-14 presently pending in the instant application.

With reference now to the Official Action and particularly page 2 thereof, claim 14 has been objected to as including a minor informality. As can be seen from the foregoing amendments, claim 14 has been amended in order to overcome such informality. Accordingly, it is respectfully submitted that Applicants claimed invention is now in proper formal condition for allowance.

With reference now to the paragraph 3 of the Office Action, claims 1, 2, 4, 5 and 7-14 have been rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement was not described in the specification. Specifically, the Examiner states that the phrase "more than 25% and no more than 37%" set forth in claims 1, 5 and 11 is considered new matter and that the phrase "but not containing nitrogen after the first step" as set forth in claim 14 is considered new matter. This rejection is respectfully traversed in that Applicants' claimed invention is now clearly supported by Applicants' specification as originally filed.

Particularly, with respect to the phrase "more than 25% and no more than 37%" as set forth in claims 1, 5 and 11, each of these claims have been amended in order to recite that the carbon content in the organic/inorganic hybrid film is about more than 17% and no more than

37%. This specific language is supported by Applicants' specification at page 47, line 3 as well as paragraph [0158] of the publication application. Further, the subject matter of independent claim 14 is supported by Applicants' specification at page 54, lines 13-15 as well as paragraph [0180] of the published application. Accordingly, it is respectfully submitted that Applicants' claimed invention as set forth in each of claims 1, 5, 11 and 14 is clearly supported by Applicants' specification as originally filed and consequently no new matter has been added.

In paragraph 5 of the Office Action, claims 1, 2, 4, 5 and 7-14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,168,726 issued to Li et al. in view of U.S. Patent No. 6,485,988 issued to Ma et al. as evidenced by U.S. Patent No. 6,054,379 issued to Yau et al. This rejection is again respectfully traversed in that the combination proposed by the Examiner neither discloses nor suggests that which is presently set forth by Applicants' claimed invention.

With respect to independent claims 1, 5, 11, as can be seen from the foregoing amendments, the methods for fabricating a semiconductor device set forth therein recite that the carbon content in the organic/inorganic hybrid film is about more than 17% and no more than 37%, and the nitrogen content in the organic/inorganic hybrid film is 5% or less. The prior art of record simply fails to disclose or remotely suggest this feature.

Specifically, Li et al. discloses forming a Black Diamond, as noted from column 3, line 52, and a low-k film on the insulating nitrogen film on an interconnection and recites in column 4, lines 16-19 that, "the preferred carbon content is between 5 and 20% atomic, more preferably between 6 to 10%." In reviewing the teachings of Li et al., it is noted that this reference neither discloses nor remotely suggests that the nitrogen content in the organic/inorganic hybrid film is 5% or less as is specifically recited by Applicants' claimed invention. In accordance with Applicants' claimed invention as recited in each of independent claims 1, 5 and 11, a device having a low dielectric constant can be obtained. Particularly, in carrying out Applicants' claimed invention, utilizing a carbon content of about more than 17% and no more than 37% can reduce the dielectric constant of the film. Furthermore, by carrying out the claimed invention such that the nitrogen content is 5% or less can suppress an increase of the dielectric constant by the nitrogen component. Additionally, with Si-N binding formed by the nitrogen component in the film, an etching can be performed without suppressing the etching in the contact hole. These particular features are neither disclosed in nor remotely suggested by the teachings of Li et al. when taken alone or in view of the teachings of Ma et al. and Yau et al.

With respect to independent claim 14, this claim recites an etching method for plasma etching an organic/inorganic hybrid film including a first step of plasma etching the film with an etching gas containing fluorine, carbon and nitrogen and a second step of plasma etching the film with an etching gas containing fluorine and carbon but not containing nitrogen after the first step. Clearly, the patent to Li et al. when taken alone or in view of the teachings of Ma et al. and Yau et al. fails to disclose or remotely suggest the particular method set forth in accordance independent claim 14.

Particularly, with the prior art, the reformation of the surface portion of organic/organic hybrid film includes removing carbon atoms or hydrogen atoms from the surface portion to obtain a composition close to that of an SiO_2 film. In doing so, this is inevitably accompanied by an increase in a specific dielectric constant which is undesirable. In accordance with Applicants' claimed invention as set forth in independent claim 14, during the etching of the organic/inorganic hybrid film, it is preferable to use an etching gas containing fluorine, carbon and nitrogen before the etching enters its final stage. At the final stage of the etching, an etching gas containing fluorine and carbon but containing no nitrogen is used in accordance with Applicants' claimed invention. In this manner, the organic/inorganic hybrid film can be etched at a high etching rate while the surface portion thereof is being reformed before the final stage of the etching period. At the final stage of the etching or subsequent to the first step of plasma etching set forth in independent claim 14, the already reformed surface portion can be etched without increasing the specific dielectric constant by plasma etching the film with an etching gas containing fluorine and carbon but not containing nitrogen. Thus, the etching rate can be improved without increasing the specific dielectric constant.

In rejecting Applicants' claimed invention, the Examiner states that Ma et al. discloses that an etching gas may contain fluorine and carbon and may be additionally comprised of nitrogen. This reference clearly fails to disclose or remotely suggest that the method set forth in independent claim 14. The Examiner relies on the teachings of *In re* Kerkhoven to support his conclusion that it is obvious to apply two known process steps sequentially or simultaneously which is analogous to apply to known compositions. The Examiner further states that it would have been obvious to one of ordinary skill in the art to perform two process steps sequentially because each of which is taught by Ma et al. to be used for the same purpose of etching low-k dielectric. However, it is respectfully submitted that in carrying out the method in accordance with independent claim 14, a first step of etching is carried out at a high etching rate and the already reformed surface portion can be etched without increasing the specific dielectric content at a final stage of etching. Clearly, there is no disclosure nor remote suggestion that would lead one of ordinary skill in the art to utilize the teachings of Ma et al. and carrying out the method set forth in independent claim 14. While the patent to Ma et al. may disclose utilizing an etching gas including or not including nitrogen, this reference clearly fails to disclose or remotely suggest the particular method steps and objectives achieved in accordance with Applicants' claimed invention. Commensurate with the teachings of Ma et al. would of ordinary skill would be lead to use nitrogen or not use nitrogen in the etching process, not to use nitrogen in an initial or first step did not use nitrogen in second step. Accordingly, it is respectfully submitted that Applicants' claimed invention as set forth in independent claim 14 as well as those claims which depend therefrom are not rendered obvious in view of the teachings of Li et al. as modified by Ma et al.

Therefore, in view of the foregoing it is respectfully requested that the objections and rejections of record be reconsidered and withdrawn by the Examiner, that claims 1, 2, 4, 5 and 7-14 be allowed and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,

Donald R. Studebaker
Reg. No. 32,815

Nixon Peabody LLP
401 9th Street N.W.
Suite 900
Washington, D. C. 20004
(202) 585-8000